

IEEE P802.3an Comments

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CI 00 SC P L # 109  
 Halder, Bijit Plato Networks  
 Comment Type E Comment Status A  
 Inconsistent page numbering: page number restarts in the middle of the document.  
 Suggested Remedy  
 Continue sequential page numbering without restart.  
 Response Response Status C  
 ACCEPT.  
 Start pagenumbering on a per-clause basis

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CI 00 SC P L # 54  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Equations in the draft require equation numbering.  
 Suggested Remedy  
 Add equation numbers to all equations in the draft.  
 Response Response Status C  
 ACCEPT.

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CI 00 SC P2 L1 # 2  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Require IEEE editor information at the start of all existing 802.3 clauses to properly indicate edits to be made by the IEEE editor.  
 Suggested Remedy  
 Changes to IEEE Std 802.3(tm)-200x  
 [These changes are part of IEEE Std 802.3-2002.]

EDITORIAL NOTE—This amendment is based on the current edition of IEEE Std 802.3-2002. The editing instructions define how to merge the material contained here into this base document set to form the new comprehensive standard as created by the addition of IEEE Std 802.3an-200x.

Editing instructions are shown in bold italic. Three editing instructions are used: change, delete, insert, and replace. Change is used to make small corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed either by using strikethrough (to remove old material) or underscore (to add new material). Delete removes existing material. Insert adds new material without disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. Replace is used to make large changes in existing text, subclauses, tables, or figures by removing existing material and replacing it with new material. Editorial notes will not be carried over into future editions because the changes will be incorporated into the base standard.

Response Response Status C  
 ACCEPT.

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CI 01 SC P2 L1 # 1  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Missing Clause 1 information.  
 Suggested Remedy  
 Add Clause 1 information for references, definitions and abbreviations.  
 Response Response Status C  
 ACCEPT.

IEEE P802.3an Comments

Cl 28 SC P1 L1 # 3  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Clause 28 doesn't use the base template used throughout the rest of the draft and therefore has incorrect header and footer information and is missing the line numbering.  
 Suggested Remedy  
 Apply base template to Clause 28.  
 Response Response Status C  
 ACCEPT.

Cl 28 SC 28 P1 L1 # 4  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Clause title should be updated for 10 Gb/s.  
 Suggested Remedy  
 Change title to read:  
 Physical Layer link signaling for 10 Mb/s, 100 Mb/s, 1000 Mb/s and 10 Gb/s Auto-Negotiation on twisted pair  
 Response Response Status C  
 ACCEPT.

Cl 28 SC 28.2.1.1 P7 L # 6  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Line too thick between T6 & T7 in Table 28-1.  
 Suggested Remedy  
 Make line a single width.  
 Response Response Status C  
 ACCEPT.

Cl 28 SC 28.2.1.1.1 P5 L # 5  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Missing editing instructions.  
 Suggested Remedy  
 Add editing instructions for the changes made in the subclause.  
 Also applies to T4 & T7 in Table 28-1; 28.2.3.4.2 (which requires renumbering editing instructions for the following subclauses); 28.2.3.4.12 (which also requires renumbering editing instructions); and 28.2.3.4.13.

Response Response Status C  
 ACCEPT.

Cl 28 SC 28.2.1.1.2 P7 L # 74  
 Thaler, Pat Agilent Technologies  
 Comment Type TR Comment Status A  
 Table 28-1 There is no text explaining optimized FLP burst entry  
 Suggested Remedy  
 Add text:  
 Optimized FLP Burst to FLP Burst limits are intended to reduce negotiation time. Devices supporting extended next page shall use T7. Other devices may use T7 or T6.

Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Eric to insert it in the right location.

Cl 28 SC 28.2.1.1.2 P7 L # 73  
 Thaler, Pat Agilent Technologies  
 Comment Type T Comment Status A  
 Table 28-1 burst width line - 2 ms is not typical for 48 bit bursts.  
 Suggested Remedy  
 Divide int line for 16 bit burst and 48 bit burst. Value is 6 ms for 48 bit burst.  
 Response Response Status C  
 ACCEPT.

Cl 28 SC 28.2.3.4.12 P14 L # 7  
Booth, Brad Intel

Comment Type E Comment Status A

Annex 28C exists in this draft specification.

*Suggested Remedy*

Add cross-reference and remove #CrossRef# indication.

Response Response Status C

ACCEPT IN PRINCIPLE.

Only if we retain Annexe 28C in this draft. We we decide that there are no changes in clause 28C, then it is not necessary to adopt the suggested remedy.

Cl 28 SC 28.2.3.4.13 P14 L # 75  
Thaler, Pat Agilent Technologies

Comment Type T Comment Status A

item d) doesn't cover the use of message code in the message code field. Perhaps g)TBD was intended to cover this.

*Suggested Remedy*

Place the following item as item g)  
A Message Code can carry information that defines how the Unformatted Message Code in an extended next page should be interpreted.

Response Response Status C

ACCEPT IN PRINCIPLE.

Merge it with item d) rather than making it a separate item.

Cl 28 SC 28.2.3.4.13 P15 L # 8  
Booth, Brad Intel

Comment Type E Comment Status A

Item g) is TBD.

*Suggested Remedy*

Add information or delete item g).

Response Response Status C

ACCEPT.

Cl 28 SC 28.2.4.1 P16 L # 81  
Thaler, Pat Agilent Technologies

Comment Type T Comment Status A

This whole subclause needs to be updated for Extended next pages.

*Suggested Remedy*

Add registers (which may be clause 45 registers) for the additional 32 bits of extended next pages to:  
auto-negotiation next page transmit register (7),  
auto-negotiation link partner ability register (8)

Perhaps add bits to 28.2.4.1.5 to indicate local and link partner ability for extended next page. Next page is duplicated in this register so perhaps this ability also should be.

Response Response Status C

ACCEPT IN PRINCIPLE.

See response to comment #9

Cl 28 SC 28.2.4.1.5 P18 L # 9  
Booth, Brad Intel

Comment Type TR Comment Status A

There is no specification on how to map the 48 bit extended NP into a 16 bit register space.

*Suggested Remedy*

Add bits to register 6 to indicate extended NP ability and link partner extended NP ability. This also requires registers in Clause 45 that can hold all three 16-bit words for transmit and receive.

Response Response Status C

ACCEPT IN PRINCIPLE.

Eric to put in an editor's note indicating that there is missing information.

See response to comment #34

Cl 28 SC 28.3 P23 L # 11  
Booth, Brad Intel

Comment Type T Comment Status A

Reference to MII interface.

*Suggested Remedy*

Change reference to include the Clause 45 MDIO management interface.

Response Response Status C

ACCEPT.

IEEE P802.3an Comments

Cl 28 SC 28.3.1 P24 L # 12  
 Booth, Brad Intel  
 Comment Type T Comment Status D  
 Add a "10GBT" variable.  
 Suggested Remedy  
 As per comment.  
 Response Response Status Z  
 WITHDRAWN.

Cl 28 SC 28.5.2.2 P37 L # 15  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Year needs to be changed.  
 Suggested Remedy  
 Change from 2002 to 200x.  
 Response Response Status C  
 ACCEPT.

Cl 28 SC 28.3.1 P28 L # 13  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 page-size variable should show editing instructions.  
 Suggested Remedy  
 As per comment.  
 Applies to nlp\_test\_min\_timer on page 30; rx\_bit\_cnt & tx\_bit\_cnt on page 32.  
 Response Response Status C  
 ACCEPT.

Cl 28 SC 28.5.3 P38 L # 77  
 Thaler, Pat Agilent Technologies  
 Comment Type TR Comment Status A  
 Add capability for extended next page support  
 Suggested Remedy  
 I can't quite recall how we handle dependencies between clauses. I think the correct thing is for it to be optional here. Clause 55 PICS cover that it be mandatory for 10GBASE-T.  
 Add PICs entries for those that support the option such as adherence to T7.  
 Response Response Status C  
 ACCEPT.  
 Make optional in Clause 28; mandatory in clause 55.

Cl 28 SC 28.3.3 P32 L # 76  
 Thaler, Pat Agilent Technologies  
 Comment Type TR Comment Status A  
 rx\_bit\_cnt: One update was missed.  
 Suggested Remedy  
 "the first 16 bits are kept" should be "the first page\_size bits are kept"  
 Response Response Status C  
 ACCEPT.

Cl 28 SC 28.5.3 P38 L # 16  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 \*MII should indicate that this is the Clause 22 management interface.  
 Suggested Remedy  
 Change "... MII Management Interface" to be "... Clause 22 Management Interface"  
 Response Response Status C  
 ACCEPT.

Cl 28 SC 28.5 P37 L # 14  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Change title to include 10 Gb/s.  
 Suggested Remedy  
 Change to read "... 10 Mb/s, 100 Mb/s, 1000 Mb/s, and 10 Gb/s..." in title, 28.5.1, and 28.5.2.2.  
 Response Response Status C  
 ACCEPT.

IEEE P802.3an Comments

Cl 28 SC 28.5.3 P38 L # 17  
 Booth, Brad Intel  
 Comment Type T Comment Status A  
 Add option for Clause 45 management.  
 Suggested Remedy  
 Add the following information:  
 \*MDIO; Implementation supports the Clause 45 Management Interface; 28.1.2; O/1; ; N/A  
 Response Response Status C  
 ACCEPT.

Cl 28 SC 28.6 P50 L # 21  
 Booth, Brad Intel  
 Comment Type E Comment Status R  
 Another service to humanity one.  
 Suggested Remedy  
 Move 28.6 to be 28.5 and shift 28.5 to be 28.6.  
 Response Response Status C  
 REJECT.  
 Commenter to submit comment against REVam

Cl 28 SC 28.5.3 P38 L # 18  
 Booth, Brad Intel  
 Comment Type T Comment Status A  
 Add option for extended next pages.  
 Suggested Remedy  
 Add the following information:  
 \*XNP; Implementation supports extended next page function; 28.x; O; ; N/A  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 See response to comment # 77

Cl 28A SC P3 L # 22  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 If there are no changes to Annex 28A, then this can be removed from the draft.  
 Suggested Remedy  
 As per comment.  
 Response Response Status C  
 ACCEPT.  
 Remove Annex 28A if it is determined that there are no changes

Cl 28 SC 28.5.4 P38 L # 20  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Add 10 Gb/s to heading.  
 Suggested Remedy  
 As per comment.  
 Response Response Status C  
 ACCEPT.

Cl 28A SC 28A P3 L27 # 78  
 Thaler, Pat Agilent Technologies  
 Comment Type T Comment Status R  
 Table 28A-1 does not cover all the unassigned values that should be reserved.  
 Suggested Remedy  
 802.3Rev should correct this. For now add an editor's note acknowledging that values are missing and that the table will be updated to match 802.3Rev when that is completed.  
 Response Response Status C  
 REJECT.  
 Eric to check that comment is submitted to rev am.

Cl 28 SC 28.5.4.1 P38 L # 19  
 Booth, Brad Intel  
 Comment Type E Comment Status R  
 Service to humanity option.  
 Suggested Remedy  
 For all the items in the following subclauses, put a 2-letter code proceeding the number.  
 Response Response Status C  
 REJECT.  
 Commenter should submit this comment against REVam

Cl 28B SC 28B.2 P4 L59 # 23  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Inserted text in Table 28B-1 not highlighted.  
 Suggested Remedy  
 Ensure inserted text is highlighted with editing instruction and the text highlighted.  
 Response Response Status C  
 ACCEPT.

IEEE P802.3an Comments

CI 28B SC 28B.3 P5 L 30 # 24  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Insertion of 10GBASE-T and change of the ordering not highlighted.  
 Suggested Remedy  
 Add editing instructions and highlight inserted text and changes performed.  
 Response Response Status C  
 ACCEPT.

CI 28B SC 28B.3 P5 L 60 # 79  
 Thaler, Pat Agilent Technologies  
 Comment Type TR Comment Status A  
 Extended Next Page bit is not covered  
 Suggested Remedy  
 The use of Extended Next Page (as indicated by bit A7) is orthogonal to the negotiated data rate, medium, or link technology. This ability shall be enabled at the end of base page exchange when both sides have indicated that they support the ability. Otherwise the ability shall be disabled.  
 Response Response Status C  
 ACCEPT.  
 With corrections of typos

CI 28C SC 28C P7 L 50 # 25  
 Booth, Brad Intel  
 Comment Type TR Comment Status A  
 The message code description "10GBASE-T and 1000BASE-T Technology Message Code" is misleading. It seems to imply that 1000BASE-T devices should use this next page message code.

Suggested Remedy  
 Change description to read:  
 Extended next page technology message code. 48-bit next pages to follow using unformatted next pages.

Change heading for 28C.11 to read:  
 Extended next page technology message code

Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Extract bit M10 from table 28C-1; change message code #9 to 10GBASE-T only. Add text to line 14 that bit M10 indicates the use of 48 bit extended next page; any following next page codes will be mapped to the 32 extra bits.

See option C from the comment #83;  
 maintenance is going on in this area - check with David Law.

CI 28C SC 28C P7 L 50 # 26  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Changes to Table 28C-1 are not highlighted.  
 Suggested Remedy  
 Add editing instructions and highlight changed text.  
 This also applies to 28C.11.  
 Response Response Status C  
 ACCEPT.

Cl 28C SC 28C.11 P9 L31 # 84  
Thaler, Pat Agilent Technologies

Comment Type TR Comment Status A

The 10GBASE-T and 1000BASE-T technology message code is only valid when extended next page mode is enabled.

*Suggested Remedy*

Add: "This message shall not be sent if extended message page mode is disabled."

Response Response Status C

ACCEPT.  
Add note to clause text.

Cl 28C SC 28C.2 P8 L8 # 82  
Thaler, Pat Agilent Technologies

Comment Type T Comment Status A

The technology ability extension codes (message codes #2 and #3) seem unlikely to ever be used in their current form. It might be best to delete these subclauses and mark as Reserved for future Auto-Negotiation use in Table 28C-1.

If this is not done, then see my comment on effect of extended next page on existing non-extended messages.

*Suggested Remedy*

See above

Response Response Status C

ACCEPT IN PRINCIPLE.

See resolution to comment #25

Cl 28C SC 28C.2 P8 L8 # 80  
Thaler, Pat Agilent Technologies

Comment Type TR Comment Status A

Should clarify use of null message for extended next pages.

*Suggested Remedy*

When Extended Next Pages are enabled, unformatted code field may be transmitted with any value and shall be ignored by the receiver.

An alternative would be to require transmit as zeros, but the text above allows the transmitter to not have to load the registers for the unformatted code field which best.

Response Response Status C

ACCEPT.  
See response to comment #25

Cl 28C SC 28C.5 P8 L28 # 83  
Thaler, Pat Agilent Technologies

Comment Type TR Comment Status A

This comment applies to 28C.5 through 28C.7, 28C.9, and possibly 28C.10.

Need to specify how to handle 16-bit page message codes when Extended Next Page ability is enabled.

Four choices:

A. These codes are only valid when not in Extended Next Page mode. For those of interest in Extended Page mode, define other codes to carry the messages.

B. These codes may be used in Extended Next Page mode. The extra bits in the Message and Unformatted pages are padded with (B1)zero or (B2)don't care.

C. These codes may be used in Extended Next Page mode. The unformatted code fields specified for the first two unformatted pages are placed in U0-U10 and U16-26. If there are more than 2 unformatted pages, Unformatted extended next pages will be sent with the remaining unformatted code fields placed in M0-M10, U0-U10 and U16-26. Any unused bits (U12-15, U17-31 and any bits allocated to unformatted code fields when there are no more fields to send) are don't care.

D. The bits from unformatted code fields are packed into U0-U31. When there are more than 32 unformatted bits required and unformatted extended next pages are sent with the bits packed into it.

C is more efficient than B but less efficient than D. It has the advantage over D that the bits are placed in the same position within the register as for 16-bit pages. B,C and D require adding an unformatted extended next page encoding to 28.2.3.4.2. A could also require this or multiple message codes could be used to pass more than 32 unformatted bits.

Remote fault number code only has a few unformatted bits so C and D are effectively the same for it.

*Suggested Remedy*

I doubt that there is much current use of the OUI, PHY identifier and 100BASE-T2 message codes. The first two because they would be lengthy exchanges and the latter because I don't know of any 100BASE-T2 implementations. There is no need to use the 1000BASE-T message code in extended next page mode as it is covered by Message Code #9.

Therefore, I suggest we use the efficient alternative of D.

Response Response Status C

ACCEPT IN PRINCIPLE.  
See response to comment #25

IEEE P802.3an Comments

Cl 28D SC 28D.6 P12 L1 # 27  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Inserted text not highlighted.  
 Suggested Remedy  
 Add editing instructions and highlight inserted text.  
 Response Response Status C  
 ACCEPT.

Cl 28D SC 28D.6 P12 L3 # 28  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 #CrossRef# indications should not be required.  
 Suggested Remedy  
 Create cross-reference to the appropriate references in Clause 55.  
 Response Response Status C  
 ACCEPT.

Cl 28D SC 28D.6 P12 L11 # 30  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Master-slave relationship (in item d and e) have not been formally established.  
 Suggested Remedy  
 Add editor's note that item d) and e) will be updated once a formal decision has been made.  
 Response Response Status C  
 ACCEPT.

Cl 28D SC 28D.6 P12 L3 # 29  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Clause 22 MII is not being used.  
 Suggested Remedy  
 Change "MII" to be "MDIO".  
 Response Response Status C  
 ACCEPT.

Cl 28D SC 28D.6 P12 L15 # 31  
 Booth, Brad Intel  
 Comment Type T Comment Status A  
 Item e) references MII registers 0-10.  
 Suggested Remedy  
 Change this to reference registers in Clause 45 MDIO.  
 Response Response Status C  
 ACCEPT.

Cl 44 SC P L # 33  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Clause 44 missing from the document.  
 Suggested Remedy  
 Add 10GBASE-T information to Clause 44 and insert into the draft.  
 Response Response Status C  
 ACCEPT.

Cl 28D SC 28D.6 P12 L20 # 32  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Period after "table" should be moved to the end of the sentence.  
 Suggested Remedy  
 As per comment.  
 Response Response Status C  
 ACCEPT.

Cl 45 SC P L # 10  
 Booth, Brad Intel  
 Comment Type TR Comment Status D  
 Clause 45 registers are missing.  
 Suggested Remedy  
 Add information for Clause 45 registers.  
 Response Response Status Z  
 WITHDRAWN.



IEEE P802.3an Comments

Cl 45 SC P L # 34

Booth, Brad Intel

Comment Type TR Comment Status A

Clause 45 MDIO registers are missing from the draft.

Suggested Remedy

Add register information for 10GBASE-T to Clause 45 and insert into the draft.

Response Response Status C

ACCEPT IN PRINCIPLE.

Text and presentation to be generated for the January meeting.

Mike McConnell, Sailesh Rao to help Pat Thaler and David Law

Cl 55 SC 1.3 P14 L48 # 89

Ungerboeck, Gottfried Broadcom

Comment Type T Comment Status A

New LDPC coding results enable the use of a more efficient mapping than PAM-12 at 800Mbaud

Suggested Remedy

Consider 128-DSQ constellation combined with (2048,1723) LDPC code described in ungerboeck\_1\_1104.pdf

Response Response Status C

ACCEPT IN PRINCIPLE.

This comment is specific to the constellation, LDPC code and framing of ungerboeck\_1\_1104.pdf

Motion to accept this comment  
Moved: Scott Powell Second: Bazhong Shen

Task force member: Y: 10 N: 17 A: 22

Motion Fails

Technical: Requires >=75%

Move to reconsider: George Eisler; seconded by Brett McClellan  
Task force members: Y: 25 N: 0 A: 8  
Motion brought forward again.

Move to accept the response:

Task force members: Y: 33 N: 4 A: 9

Technical: requires >=75%  
Motion passes

IEEE P802.3an Comments

Cl 55 SC 1.3 P14 L58 # 86  
 Powell, Scott Broadcom  
 Comment Type T Comment Status A  
 If PHY's advertise support for loop timing during autoneg, it can be made optional without impacting interoperability.  
 Suggested Remedy  
 See proposal in powell\_1\_1104.pdf.  
 Response Response Status C  
 ACCEPT.  
 Scott to provide specific wording of suggested change  
 Motion to accept comment made by George Zimmerman  
 Seconded by Sailesh Rao  
 Task Force Members:  
 Y: 35 N: 0 A: 11  
 Motion passes. Comment is accepted

Cl 55 SC 1.3.1 P17 L10 # 90  
 Ungerboeck, Gottfried Broadcom  
 Comment Type T Comment Status A  
 All TBD's in this paragraph are defined in ungerboeck\_1\_1104.pdf.  
 Suggested Remedy  
 Consider framing proposal in ungerboeck\_1\_1104.pdf  
 Response Response Status C  
 ACCEPT.  
 As per motion associated with comment # 89

Cl 55 SC 1.3.1 P17 L15 # 87  
 Powell, Scott Broadcom  
 Comment Type T Comment Status A  
 One sync bit per PCS frame is adequate for frame synchronization and fly-wheel (re-) synchronization.  
 Suggested Remedy  
 See proposal in ungerboeck\_1\_1104.pdf  
 Response Response Status C  
 ACCEPT.

Cl 55 SC 1.4 P18 L33 # 127  
 Tellado, Jose Teranetics  
 Comment Type T Comment Status R txbackoff  
 TBD power levels  
 Suggested Remedy  
 5 power levels  
 Response Response Status C  
 REJECT.

Cl 55 SC 2.1.2.1 P20 L20 # 124  
 Tellado, Jose Teranetics  
 Comment Type T Comment Status R txbackoff  
 from 1 to TBD  
 Suggested Remedy  
 from 1 to 5  
 Response Response Status C  
 REJECT.

Cl 55 SC 2.4.1 P22 L34 # 125  
 Tellado, Jose Teranetics  
 Comment Type T Comment Status R txbackoff  
 from 1 to TBD  
 Suggested Remedy  
 from 1 to 5  
 Response Response Status C  
 REJECT.

Cl 55 SC 3 P37 L1 # 72  
 Hormis, Raju Columbia University, N

Comment Type T Comment Status R metric

Decoding of LDPC code groups:

LDPC decoders require probability metrics as input, rather than direct channel observations. For the multi-dimensional constellations under consideration, the metrics are not necessarily 1D functions.

The presentation slides show examples of metric plots for 1D and 2D constellations.

*Suggested Remedy*

Recommendation :

- a) Use of 2D (or higher) metric functions for decoding, depending on the constellation.
- b) the metric plots tend to be piece-wise linear/planar, and may be easy to map into gates or LUT's.
- c) a table of the piece-wise linear metric surface should be documented.

Response Response Status C

REJECT.

Receiver implementation details do not need to be specified.

The commenter can provide informative text for adoption in the draft.

Cl 55 SC 3.5 P34 L28 # 128  
 Tellado, Jose Teranetics

Comment Type T Comment Status A

TBD1:TBD2

*Suggested Remedy*

25:64

(which is equivalent to 312.5:800)

Response Response Status C

ACCEPT.

Cl 55 SC 4.2.3 P48 L53 # 126  
 Tellado, Jose Teranetics

Comment Type T Comment Status D blockber

LBBER of less than 10<sup>-9</sup>TBD

*Suggested Remedy*

LBBER of less than 1.6E-9 (for LDPC(833,1024))

Response Response Status Z

WITHDRAWN.

Cl 55 SC 4.3.1 P50 L33 # 123  
 Tellado, Jose Teranetics

Comment Type T Comment Status A

The THP coefficients shall be selected from a predetermined set and shall be fixed after startup.

*Suggested Remedy*

The THP coefficient shall be selected from a predetermined set of 4 IIR THP coefficients or 4 FIR coefficient THPs or the option of bypassing the THP altogether. Each of the THP filters (plus bypass) shall be optimized to a decreasing length of cable (from max length to 0m length) and be associated with the power levels of 5dBm (max len), 2.5dBm, 0dBm, -2.5dBm and -5dBm (THP bypass)

Response Response Status C

ACCEPT IN PRINCIPLE.

Remove reference to power levels so that the remedy is now:

The THP coefficient shall be selected from a predetermined set of 4 IIR THP coefficients or 4 FIR coefficient THPs or the option of bypassing the THP altogether. Each of the THP filters (plus bypass) shall be optimized to a decreasing length of cable (from max length to 0m length). The THP filter coefficients shall be fixed after startup.

Cl 55 SC 4.6.1 P52 L56 # 91  
 Ungerboeck, Gottfried Broadcom

Comment Type T Comment Status A startup

Editor's note solicits inputs on PHY start-up.

*Suggested Remedy*

Refer to start-up proposal in ungerboeck\_1\_1104.pdf.

Response Response Status C

ACCEPT IN PRINCIPLE.

With changes to make it consistent with Startup motion in agenda\_1\_1104

CI 55 SC 5.6.1 P67 L13 # 88  
Powell, Scott Broadcom

Comment Type T Comment Status A blockber

Since multiple bit errors per frame don't matter, the simplifying assumption of 1 bit error per block error should provide a reasonable spec for BLER.

*Suggested Remedy*

Replace 1e-TBD with (number of information bits per frame) x 1e-12 as the LDPC code block error rate specification.

Response Response Status C

ACCEPT IN PRINCIPLE.

Replace 1e-TBD with 3.2e-9 as the LDPC code block error rate specification.

CI 55 SC 55.1 P13 L12 # 35  
Booth, Brad Intel

Comment Type E Comment Status A

Delete "Clause".

*Suggested Remedy*

As per comment.

Response Response Status C

ACCEPT.

CI 55 SC 55.1.1 P13 L15 # 110  
Halder, Bijit Plato Networks

Comment Type E Comment Status A

The word comprise is misused.

*Suggested Remedy*

Replace it with a correct word such as compose or constitute or make up.

Response Response Status C

ACCEPT IN PRINCIPLE.

Replace "comprise" with "define"

CI 55 SC 55.1.1 P13 L23 # 36  
Booth, Brad Intel

Comment Type TR Comment Status A cabling

Objective a) seems to be creating some conflict. This text is only informative and should represent the Objectives approved by 802.3. This wouldn't normally be a TR, but considering it impacts what was approved by 802.3, I wanted to make sure that the TF deals with this appropriately.

*Suggested Remedy*

Expand objective a) to read:

- a) Support full duplex operation only.
- b) Support star-wired local area networks using point-to-point links and structured cabling topologies.
- c) Support a speed of 10.000 Gb/s at the MAC/PLS service interface.
- d) Select copper medium from ISO/IEC 11801:2002, with appropriate augmentation as specified in 55.7.
- e) Support operation over 4-connector structured 4-pair, twisted-pair copper cabling for all supported distances and Classes.
- f) Define a single 10 Gb/s PHY that would support links of:
  - 1) 100 m on four-pair Class F balanced copper cabling,
  - 2) At least 55 to 100 m on four-pair Class E balanced copper cabling.

Shift existing items b) through f) to be g) through k).

Delete second part of Editor's Note related to item a)3). See comments on 55.7 that deal with how to add Augmented Class E.

Response Response Status C

ACCEPT.

CI 55 SC 55.1.2 P14 L26 # 37  
Booth, Brad Intel

Comment Type T Comment Status A

Do not highlight the medium as specifying the medium is beyond the scope of the Task Force.

*Suggested Remedy*

Remove shading from MEDIUM.

Response Response Status C

ACCEPT.

Cl 55 SC 55.1.3 P14 L48 # 95  
 McClellan, Brett SolarFlare  
 Comment Type E Comment Status A  
 Thirteen PAM levels are listed.  
 Suggested Remedy  
 Remove -2.  
 Response Response Status C  
 ACCEPT.

Cl 55 SC 55.1.3.1 P17 L15 # 112  
 Halder, Bijit Plato Networks  
 Comment Type E Comment Status A  
 The sentence starts with a period.  
 Suggested Remedy  
 Remove the period and space to align the line.  
 Response Response Status C  
 ACCEPT.

Cl 55 SC 55.1.3.1 P17 L10 # 94  
 McClellan, Brett SolarFlare  
 Comment Type T Comment Status R  
 Update the clause assuming acceptance of the PAM12 LDPC-CRC framing proposal.  
 Suggested Remedy  
 Replace the text starting on line 10 through line 23 with:  
 "The resulting 65-bit blocks are taken in groups of 25 to form an LDPC transmit frame with a 16 bit CRC and 2 bits of pad. 833 bits of the frame are encoded using a (1024,833) LDPC encoder and mapped to cosets in the PAM12 constellation. The remaining 810 bits are left uncoded and mapped to the partitions in the PAM12 constellation. The result is an LDPC block consisting of 128 four dimensional PAM12 symbols that are passed on the PMA via PMA\_UNITDATA.request signal. The PMA transmit block operates continuously this stream of four dimensional symbols. Details of the mapping are covered in TBD. In the receive direction, in normal mode, the PCS processes code-groups received from the remote PHY via the PMA in 128 4D symbol blocks and maps them to the XGMII service interface in the receive path. In this receive processing scheme, symbol clock synchronization is done by the PMA receive function."  
 Response Response Status C  
 REJECT.  
 As per motion on comment # 101  
 Task force to decide on comment

Cl 55 SC 55.1.3.1, 55.3 P All L All # 120  
 Sailesh Rao Phyten Technologies, I  
 Comment Type TR Comment Status R  
 The PCS section is missing Coding, Framing and Mapping details. The 12-Dimensional PAM-12 mapping proposal does not meet MTTFFPA requirements and is not amenable to robust receiver implementations, as outlined in the preamble section of the attached presentation.  
 Suggested Remedy  
 Use Coding, Framing and Mapping details as outlined in the Comment resolution section of the attached presentation (rao\_1\_1104.pdf).  
 Response Response Status U  
 REJECT.  
 Task force to review; task force to decide  
 Motion to accept proposed remedy as per comment  
 Moved by : Juan Jover Seconded by: Sailesh Rao  
 Task force members: Y: 9 N: 23 A: 22  
 Motion: Fails  
 Technical : Requires >=75% to pass

Cl 55 SC 55.1.3.1 P17 L15 # 38  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Period at start of sentence.  
 Suggested Remedy  
 Delete period.  
 Response Response Status C  
 ACCEPT.

CI 55 SC 55.1.3.2 P17 L47 # 111

Halder, Bijit Plato Networks

Comment Type T Comment Status A

The use of transmit filter is confusing. Compare it with Editor's comment on line 16 page 63 where the transmit filter is eliminated. Moreover, the use of article "a" is misleading. Is a single filter used to process the four dimensional signal and shared among all four DACs?

*Suggested Remedy*

State clearly if digital transmit filtering is used before DAC, and if used, clearly state if they are operating on single dimensional or multi-dimensional signal.

Response Response Status C

ACCEPT IN PRINCIPLE.

Proposed text:

CI 55 SC 55.1.4 P18 L34 # 96

McClellan, Brett SolarFlare

Comment Type T Comment Status A

Training pattern is listed as TBD.  
All proposals are using PAM2.

*Suggested Remedy*

Change TBD to PAM2.

Response Response Status C

ACCEPT.

CI 55 SC 55.10 P89 L53 # 64

Booth, Brad Intel

Comment Type E Comment Status A

Unit of measure should be shifted.

*Suggested Remedy*

Change "Mb/s" in item a) to be "Gb/s".

Response Response Status C

ACCEPT.

CI 55 SC 55.11.1 P90 L26 # 66

Booth, Brad Intel

Comment Type E Comment Status A

In Table 55-10, the first parameter doesn't need the last "<=> MDI".

*Suggested Remedy*

Delete.

Response Response Status C

ACCEPT.

CI 55 SC 55.2.7 P24 L4 # 129

McClellan, Brett SolarFlare

Comment Type T Comment Status A

Descrambler synchronization only applies to PAM2 training mode.

*Suggested Remedy*

Change text to:

The parameter scr\_status conveys to the PMA Receive function the information that the training mode descrambler has achieved synchronization.

and also on line 16:

OK The training mode descrambler has achieved synchronization.

NOT\_OK The training mode descrambler is not synchronized.

Response Response Status C

ACCEPT.

CI 55 SC 55.3 P16 L24 # 93

McClellan, Brett SolarFlare

Comment Type T Comment Status A

Signal "10GBTreceive" is a carryover from carrier sense in 1000BASE-T.

It appears in figure 55-3 on page 16, figure 55-5 on page 26, and line 57 on page 35.

*Suggested Remedy*

Remove 10GBTreceive from figure 55-3 on page 16 and figure 55-5 on page 26.

Remove the last sentence on page 35, lines 56 and 57.

Response Response Status C

ACCEPT.

Cl 55 SC 55.3 P25 L60 # 85  
Thaler, Pat Agilent Technologies

Comment Type TR Comment Status A

I am concerned that the code described here and in 54.4 has not been sufficiently analyzed for undetected error rate and will allow that rate to be excessively high.

*Suggested Remedy*

Either show that sufficient undetected error rate is adequate or provide modifications to improve undetected error rate.

Adequate: The original IEEE 802.3 goal in the early 1980s was less than 1 per link per year, but all recent standards achieve much better. The original goal is not adequate for the systems where 10GBASE-T might be deployed. At least 100s of years per undetected error per link should be achieved.

Response Response Status W

ACCEPT IN PRINCIPLE.

Task force to review proposals and their analysis of undetected error event intervals; requirement on mean time between undetected error events to be clarified. Is it "life of the universe" or is it 100 years?

Cl 55 SC 55.3 P35 L25 # 105  
McClellan, Brett SolarFlare

Comment Type T Comment Status R

Update the clause assuming acceptance of the PAM12 LDPC-CRC framing proposal.  
Add description of CRC16 check.

*Suggested Remedy*

Add a new section with the following text:

Following LDPC decoding and PAM12 demapping, a CRC check is performed on the 1643 bit block.

The CRC is 16-bits, and the polynomial is:

$G(x) = X^{16} + X^{15} + X^{11} + X^8 + X^6 + X^5 + X^4 + X^3 + X + 1$

A CRC failure is reported to the LBER monitor state machine.

Response Response Status C

REJECT.

As per motion on comment #101

Cl 55 SC 55.3 P41 L4 # 92  
McClellan, Brett SolarFlare

Comment Type T Comment Status A diagram

Figure 55-12 refers to TX\_ER from GMII which does not exist in XGMII.

*Suggested Remedy*

Remove figure 55-12. It serves no purpose.

Response Response Status C

ACCEPT.

Cl 55 SC 55.3.10 P35 L50 # 104  
McClellan, Brett SolarFlare

Comment Type T Comment Status A

Only the training mode descrambler requires state acquisition.  
The data mode scrambler is self-synchronizing.

*Suggested Remedy*

Change text to:

During training mode, PCS Receive checks the received framing and signals the reliable acquisition of the descrambler state by setting the parameter scr\_status to OK.

Response Response Status C

ACCEPT.

Cl 55 SC 55.3.11.1 P36 L52 # 106  
McClellan, Brett SolarFlare

Comment Type T Comment Status A startup

Add equations for generation of Syn[3:0] based on Seki's proposal with modification for frame synchronization during training.

*Suggested Remedy*

Change clause title to:

Generation of bits Syn[3:0]

Add equations from Seki\_2\_0904 page 9 with the following modification (see proposal):

Syn[0] = !Scrn[0] for n = k\*128, k = 1,2,3,....

Scrn[0] else

Response Response Status C

ACCEPT IN PRINCIPLE.

Change clause title to:

Generation of bits Syn[3:0]

Add equations from Seki\_2\_0904 page 9 with the following modification (see proposal):

Syn[0] = !Scrn[0] for n = k\*256, k = 1,2,3,....

Scrn[0] else

CI 55 SC 55.3.11.1 P36 L52 # 67  
 Seki, Katutoshi NEC Electronics

Comment Type TR Comment Status A startup

Task Force needs to specify scrambler sequence for PMA training. Slide 8 of seki\_1\_1104.pdf shows detail scrambler sequence. By using proposed PMA training signal, polarity correction, pair swap, pair deskew can be established

**Suggested Remedy**

Change sub clause title "Generation of bits Sxn[3:0], Syn[3:0], and Sgn[3:0]" to "Generation of bits Syn[3:0]"

Insert following sentence

"PMA Training signal encoding rules are based on the generation, at time n, of the four bits Syn[3:0]. These four bits are generated in a systematic fashion using Scrn[0], and an auxiliary generating polynomial, g(x). These four bits are mutually uncorrelated. For both master and slave PHYs, they are obtained by the same linear combinations of bits stored in the transmit scrambler shift register delay line. These four bits are derived from elements of the same maximum-length shift register sequence of length  $2^{33}-1$  as Scrn[0], but shifted in time. The associated delays are all large and different so that there is no short-term correlation among the bits Syn[3:0]. The bits Syn[3:0] are generated as follows:  
 (insert equations of slide 8 here)"

Response Response Status C

ACCEPT IN PRINCIPLE.

With changes to make it consistent with Startup motion in agenda\_1\_1104

CI 55 SC 55.3.11.2 P36 L57 # 68  
 Seki, Katutoshi NEC Electronics

Comment Type TR Comment Status A startup

Task Force needs to specify PMA training symbol vectors. Slide 8 of seki\_1\_1104.pdf shows detail symbol vectors for PMA training. By using proposed PMA training signal, polarity correction, pair swap, pair deskew can be established

**Suggested Remedy**

Insert following sentence

"The four-bit word Syn[3:0] is mapped to a 4-D symbols (TAn, TBn, TCn, TDn) according to following equations:  
 (insert equations of slide 8 here)"

Response Response Status C

ACCEPT.

CI 55 SC 55.3.11.2 P36 L59 # 107  
 McClellan, Brett SolarFlare

Comment Type T Comment Status A startup

Add equations for generation transmit symbol vector based on Seki's proposal.

**Suggested Remedy**

Add equations from Seki\_2\_0904 page 9

Response Response Status C

ACCEPT.

CI 55 SC 55.3.11.4 P37 L5 # 108  
 McClellan, Brett SolarFlare

Comment Type T Comment Status A startup

This section describes the descrambler for training mode only.

**Suggested Remedy**

change clause title to: Training mode descrambler polynomials

change text from:

The PHY shall descramble the PMA training stream and return the proper sequence of code-groups.

to:

The PHY shall acquire descrambler state synchronization to the PAM2 training sequence and report success through scr\_status.

Response Response Status C

ACCEPT.

CI 55 SC 55.3.12.2.2 P38 L17 # 133  
 McClellan, Brett SolarFlare

Comment Type T Comment Status A framing

update text assuming acceptance of the LDPC-CRC proposal.

**Suggested Remedy**

Change text to:

Boolean indication that is set true if received LDPC block has valid CRC.

Response Response Status C

ACCEPT.



Cl 55 SC 55.3.12.2.3 P38 L46 # 135  
 McClellan, Brett SolarFlare

Comment Type T Comment Status A framing  
 rx\_symb\_vector is previously defined as the output from the PMA to the PCS, not the input to the 65B decoder.

Suggested Remedy  
 change text to:

Decodes the 65-bit vector returning rx\_raw<71:0> which is sent to the XGMII.

Response Response Status C  
 ACCEPT IN PRINCIPLE.

But with clarification/correction.  
 The DECODE() function as described includes the PAM12 demapping, FEC decoding and 65B decoding. Basically all functions in Fig 55-7. The argument in DECODE() should be changed to rx\_symb\_vector<TBD:0>

Cl 55 SC 55.3.12.2.3 P38 L51 # 134  
 McClellan, Brett SolarFlare

Comment Type T Comment Status A framing  
 tx\_symb\_vector is defined earlier as the input to the PMA, not the output of the 65B encoder.

Suggested Remedy  
 change text to:

Encodes the 72-bit vector returning tx\_coded<64:0> all of which is sent to the scrambler.

Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 The ENCODE() function as described includes the 65B encoding, FEC encoding and PAM12 mapping. Basically all functions in Fig 55-6

Cl 55 SC 55.3.12.4 P43 L1 # 41  
 Booth, Brad Intel

Comment Type E Comment Status A  
 Figure 55-13 has state transition equations overlapping the transition arrow.

Suggested Remedy  
 Move equations to not overlap the lines.

Response Response Status C  
 ACCEPT.

Cl 55 SC 55.3.12.4 P43 L30 # 42  
 Booth, Brad Intel

Comment Type T Comment Status A diagram  
 Exit transitions from VALID\_SH, INVALID\_SH, SLIP and Frame\_GOOD back to RESET\_CNT have different transition equations; therefore, they cannot use the same exit transition line.

Suggested Remedy  
 Break exit transitions out to be separate lines.

Response Response Status C  
 ACCEPT.

The exit lines are different. They are combined after the exits to a common line because they go to the same state

Cl 55 SC 55.3.12.4 P44 L38 # 43  
 Booth, Brad Intel

Comment Type T Comment Status A diagram  
 Exit transition equations different from HI\_LBER and GOOD\_LBER to START\_TIMER.

Suggested Remedy  
 Create separate exit transition lines.

Response Response Status C  
 ACCEPT.

The exit lines are different. They are combined after the exits to a common line because they go to the same state

Cl 55 SC 55.3.12.4 P45 L42 # 44  
 Booth, Brad Intel

Comment Type T Comment Status A diagram  
 Exit transition from TX\_E and TX\_T to TX\_E are different.

Suggested Remedy  
 Create separate exit transition lines.

Response Response Status C  
 ACCEPT.

Cl 55 SC 55.3.12.4 P46 L30 # 45  
 Booth, Brad Intel  
 Comment Type T Comment Status A diagram  
 Entrance transition to RX\_E from RX\_D is different than from RX\_INIT and RX\_C.  
 Suggested Remedy  
 Create a new entrance transition line from RX\_D to RX\_E.  
 Response Response Status C  
 ACCEPT.

Cl 55 SC 55.3.2.1 P27 L6 # 39  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 The reference to 36.2.5.1.3 is a GMII reference.  
 Suggested Remedy  
 Power on should be described in this clause.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Delete 55.3.2.1.

Cl 55 SC 55.3.2.2 P27 L27 # 97  
 McClellan, Brett SolarFlare  
 Comment Type T Comment Status A  
 Update the clause assuming acceptance of the PAM12 LDPC-CRC framing proposal.  
 Suggested Remedy  
 Change text to:  
 The subsequent functions of the PCS Transmit process then pack the resulting bits into a Low Density Parity Check (LDPC) block and then places the block into a transmit frame.  
 Response Response Status C  
 ACCEPT.

Cl 55 SC 55.3.2.2 P27 L31 # 99  
 McClellan, Brett SolarFlare  
 Comment Type T Comment Status A  
 Text refers to LDPC frame synchronization headers, but no proposals contain these headers.  
 I propose to perform synchronization during the PAM2 training pattern (see proposal).  
 Suggested Remedy  
 Change text to:

When the receive channel is in training mode, the PCS Synchronization process continuously monitors PMA\_SIGNAL.indicate(SIGNAL\_OK). When SIGNAL\_OK indicates OK, then the PCS Synchronization process accepts data-units via the PMA\_UNITDATA.indicate primitive. It attains frame synchronization based on the sync bits contained in pair A training pattern.  
 The PCS Synchronization process sets the sync\_status flag to indicate whether the PCS has obtained synchronization.

Response Response Status C  
 ACCEPT.

Cl 55 SC 55.3.2.2 P27 L39 # 98  
 McClellan, Brett SolarFlare  
 Comment Type T Comment Status R  
 Update the clause assuming acceptance of the PAM12 LDPC-CRC framing proposal. LBER should be based on the CRC that detects both coded and uncoded errors.  
 Suggested Remedy  
 Change text to:  
 When the PCS Synchronization process has obtained synchronization, the LDPC Block Error Rate (LBER) process monitors the signal quality asserting hi\_lber if excessive CRC errors are detected.  
 Response Response Status C  
 REJECT.  
 As per motion relating to comment #101

Cl 55 SC 55.3.2.2 P28 L 8 # 130  
McClellan, Brett SolarFlare

Comment Type T Comment Status R

Update text assuming LDPC-CRC framing proposal is accepted.

*Suggested Remedy*

Change text to:

During transmission, the 65B bits are scrambled by the PCS using a PCS scrambler, a 16-bit CRC is added then data frames are encoded and mapped into code-groups of four dimensional symbols and transferred to the PMA.

Response Response Status C

REJECT.

As per motion on comment #101

Cl 55 SC 55.3.3 P28 L 15 # 131  
McClellan, Brett SolarFlare

Comment Type T Comment Status A startup

Update text assuming approval of PAM2 training frame synchronization proposal.

*Suggested Remedy*

Change text to:

The PAM2 training frame synchronization bits allow establishment of block boundaries by the PCS Synchronization process.

Response Response Status C

ACCEPT.

Cl 55 SC 55.3.4 P28 L 27 # 100  
McClellan, Brett SolarFlare

Comment Type T Comment Status A

Text refers to LDPC frame synchronization headers, but no proposals contain these headers.

*Suggested Remedy*

remove the following text:

In addition, the synchronization headers of the code enable the receiver to achieve block alignment on the incoming PHY bit stream.

Response Response Status C

ACCEPT.

Cl 55 SC 55.3.4 P28 L 31 # 101  
McClellan, Brett SolarFlare

Comment Type T Comment Status R

Update the clause assuming acceptance of the PAM12 LDPC-CRC framing proposal. Change framing diagrams and descriptions for framing and mapping.

*Suggested Remedy*

Replace Figures 55-6 and 55-7 with the figures on pages 6,7 and 10 of the PAM12 LDPC-CRC framing proposal. Also add PAM12T mapping tables from pages 12 to 16.

Add the following text:

The transmit frame is 128 4D PAM12 symbols and is constructed from 25 65B blocks followed by an 18-bit pad. The resulting 1643 bits are partitioned according to figures TBD. 833 bits are coded and 810 are left uncoded. The bits are taken in groups of 43 with the first 24 to be coded and the last 19 to be left uncoded. After 34 groups of 43 bits, the next 17 bits are coded and the remaining 164 bits are left uncoded. The data framer is responsible for collecting 25 blocks of 65B encoded TX data and constructing a block of 1643 bits for transmission. This block is divided into 2 sets. The first set of 833 bits will be LDPC encoded to generate 191 parity bits and the total set of 1024 bits will be mapped into PAM4 cosets according to table TBD. The second set of 810 bits will be left uncoded and used for partition mapping of the PAM12 symbols according to tables TBD. The first 126 symbols are mapped using 12D-PAM12T partition mapping using 798 uncoded bits, and the remaining two symbols are mapped using 4D-PAM12 partition mapping using 12 bits.

Response Response Status C

REJECT.

Motion to accept framing, LDPC & mapping as per dabiri\_1\_1104.pdf as a resolution to this comment.

Motion moved by: Brett McClellan Seconded by : Dariush Dabiri

Task Force members: Y: 20 N: 18 A:11

Motion fails: Comment rejected

Technical: requires >=75%

Cl 55 SC 55.3.4 P28 L35 # 102  
McClellan, Brett SolarFlare

Comment Type T Comment Status R

Update the clause assuming acceptance of the PAM12 LDPC-CRC framing proposal.  
Add description of TX CRC16 calculation

*Suggested Remedy*

Add the following text:

Following the collection of 25 blocks of 65B, a CRC is calculated on the entire block including 2 bits of pad and appended to the block replacing the last 16 pad bits. The CRC is 16-bits, and the polynomial is:

$$G(x) = X^{16} + X^{15} + X^{11} + X^8 + X^6 + X^5 + X^4 + X^3 + X + 1$$

Response Response Status C

REJECT.

As per motion on comment #101

Cl 55 SC 55.3.4 P29 L42 # 40  
Booth, Brad Intel

Comment Type E Comment Status A

In Figure 55-6 the "PMA service interface" is in bold.

*Suggested Remedy*

Change to be plain text and line up with other text on the left of the figure.

The same applies to Figure 55-7.

Response Response Status C

ACCEPT.

Cl 55 SC 55.3.6 P34 L46 # 132  
McClellan, Brett SolarFlare

Comment Type T Comment Status A

To prevent correlation between local and remote transmit sequences, either different scrambler polynomials should be used, or the scrambler states should be initialized differently. I propose the latter.

*Suggested Remedy*

change text to:

The initial values of the scrambler shall be set differently for master and slave. The master initial value shall be 0xTBD and the initial slave value shall be 0xTBD.

Response Response Status C

ACCEPT.

Cl 55 SC 55.3.8 P35 L22 # 103  
McClellan, Brett SolarFlare

Comment Type T Comment Status A startup

Text refers to LDPC frame synchronization headers, but no proposals contain these headers.

I propose to perform synchronization during the PAM2 training pattern (see proposal).

Also as frame synchronization is receiver based the state machine does not need to be specified.

*Suggested Remedy*

Change text to:

It obtains lock to the LDPC frames during the PAM2 training pattern using synchronization bits provided on pair A. The 65-bit blocks are extracted based on their location in the LDPC frame.

delete text:

Lock is obtained as specified in the block lock state machine shown in Figure 55-13.

remove figure 55-13

Response Response Status C

ACCEPT.

Cl 55 SC 55.4.2 P48 L8 # 46  
Booth, Brad Intel

Comment Type E Comment Status A

The management interface and functions for 10G are specified in Clause 45.

*Suggested Remedy*

Change reference to point to Clause 45.

Response Response Status C

ACCEPT.

Cl 55 SC 55.4.2.4 P49 L 23 # 69  
 Seki, Katutoshi NEC Electronics

Comment Type TR Comment Status A startup

Task Force needs to specify detail startup protocol and PHY control function. Slide 2 of seki\_1\_1104.pdf shows overview of our startup proposal and slide3 shows detail PHY control state diagram. This startup proposal assumed THP and power backoff coefficients are determined at auto-negotiation or cable diagnostics.

*Suggested Remedy*

Change following sentence to comply the startup protocol and PHY control function of seki\_1\_1104.pdf.

L23: Modify "...converges its decision feedback equalizer (DFE).." to "... converges its equalizers..."

L26-27: Modify "TRAINING state" to "PMA TRAINING state"

L32-37: Modify

"When the minwait\_timer expires and the condition loc\_rcvr\_status=OK is satisfied, PHY Control transitions into TBD. The normal mode of operation corresponds to the SEND PCS DATA state, where PHY Control asserts tx\_mode=SEND\_N and transmission of data over the link can take place."

to

"For Master PHY, when the minwait\_timer expires and the condition loc\_rcvr\_status=OK and rmt\_rcvr\_status=OK is satisfied, PHY Control transitions into PCS TRAINING state. Upon entering the PCS TRAINING state, the minwait\_timer is started and SEND\_N is asserted as tx\_mode. During PCS TRAINING state, PCS Transmit send LDPC blocks which convey a XGMII data stream representing idle or link fault signal. For Slave PHY, when the minwait\_timer expires and the condition block\_lock is satisfied, PHY Control transitions into PCS TRAINING state. PCS TRAINING state always starts at Master PHY. After the PHY completes successful PCS training, PCS asserts PCS\_status=OK. When PCS\_status=OK is satisfied, PHY control transitions to SEND PCS DATA state, where PHY Control asserts tx\_mode=SEND\_N and PCS Transmit send LDPC blocks which convey a XGMII data stream. In this state, when RS layer detects neither local fault signal nor remote fault signal, XGMII data stream conveys data or idle.

If unsatisfactory PCS receiver operation is detected in the SEND PCS DATA state(PCS\_status=NOT\_OK) and the minwait\_timer has expired, PHY Control enters the SLAVE SILENT state."

Response Response Status C

ACCEPT IN PRINCIPLE.

With changes to make it consistent with Startup motion in agenda\_1\_1104

Cl 55 SC 55.4.3.1 P50 L 25 # 118  
 Halder, Bijit Plato Networks

Comment Type TR Comment Status A

The limits of k are undefined and confusing in the equation for bi and s(t). Also, the operation mod12 is undefined.

*Suggested Remedy*

Define the limits of k as follows:

For the first equation for bi, k=1 to infinity

For the second equation for s(t), k=0 to infinity

For a real number x, define (x)mod12 as a value between the interval (-12, 12] such that (x)mod12 = x + 24m, for some integer m.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change suggested text to reflect DSQ choice

For the first equation for bi, k=1 to infinity

For the second equation for s(t), k=0 to infinity

For a real number x, define (x)mod16 as a value between the interval (-16, 16] such that (x)mod16 = x + 32m, for some integer m.

Cl 55 SC 55.4.3.2 P50 L 42 # 119  
 Halder, Bijit Plato Networks

Comment Type T Comment Status A formula

The variable a\_(k,agmt) and limits of k are undefined.

*Suggested Remedy*

Define a\_(k,agmt) similar to a\_k in the previous equation on the same page. Define the limits of k as 0 to infinity.

Response Response Status C

ACCEPT IN PRINCIPLE.

Fix text to be consistent with response to comment #118

CI 55 SC 55.4.5 P51 L48 # 70  
 Seki, Katutoshi NEC Electronics

Comment Type TR Comment Status A startup

Task Force needs to specify detail state diagrams variables and timers for PHY control function and link monitor. Slide 5 and 6 of seki\_1\_1104.pdf shows state diagrams variables and timers used in our startup proposal. Expire times are re-used from 1000BASE-T. These expire times have close relation with auto-negotiation state diagram. If we change these expire times, we need to revisit clause 28 to make sure we don't break it. It may be necessary to make modifications to this.

*Suggested Remedy*

Insert state diagrams variables and timers shown in Slide 5 and 6 of seki\_1\_1104.pdf.

Response Response Status C

ACCEPT IN PRINCIPLE.

With changes to make it consistent with Startup motion in agenda\_1\_1104

CI 55 SC 55.4.6 P52 L52 # 71  
 Seki, Katutoshi NEC Electronics

Comment Type TR Comment Status A startup

Figure 55-19, Figure 55-20

Task Force needs to specify detail PHY control and link monitor state diagrams. Slide 3 of seki\_1\_1104.pdf shows PHY control state diagram in our startup proposal. Current link monitor state diagram in D1.1 is same as 1000BASE-T and uses loc\_rcvr\_status(local receiver PMA status). In 1000BASE-T, PCS and PMA are combined. But, in 10GBASE-T, PCS and PMA are separated. So, PCS\_status should be used in stead of loc\_rcvr\_status.

*Suggested Remedy*

Insert state diagrams shown in Slide 3 and 4 of seki\_1\_1104.pdf.

Response Response Status C

ACCEPT IN PRINCIPLE.

With changes to make it consistent with Startup motion in agenda\_1\_1104

CI 55 SC 55.4.6 P53 L14 # 47  
 Booth, Brad Intel

Comment Type T Comment Status A diagram

Figure 55-19 needs to be cleaned up and properly formatted.

*Suggested Remedy*

Lines in state boxes separating state name from state functions should go from side to side with no gap. 3 states have the same name and should be renamed to be different. State boxes should be the same width without the functions running into the lines of the box. TBD transitions need to be added.

Response Response Status C

ACCEPT IN PRINCIPLE.

Figure/boxes will be cleaned up. TBDs need to be resolved by task force.

CI 55 SC 55.4.6.2 P54 L19 # 48  
 Booth, Brad Intel

Comment Type T Comment Status A diagram

State transitions share the same transition line, but have different transition equations.

*Suggested Remedy*

Add a new transition line from either LINK\_UP or HYSTERESIS to LINK\_DOWN.

Response Response Status C

ACCEPT.

CI 55 SC 55.5.1.1 P55 L33 # 49  
 Booth, Brad Intel

Comment Type E Comment Status A

Use of the word "Clause" when referencing a subclause number.

*Suggested Remedy*

Delete all three "Clause" from this paragraph.

Response Response Status C

ACCEPT.

CI 55 SC 55.5.2 P56 L28 # 51  
 Booth, Brad Intel

Comment Type E Comment Status A

Extra dash in Table reference.

*Suggested Remedy*

Remove dash between "Table" and "55-3".

Response Response Status C

ACCEPT.

Cl 55 SC 55.5.2 P56 L28 # 50  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Missing a space.  
 Suggested Remedy  
 Add a space between "bits" and "(10GBASE-T".  
 Response Response Status C  
 ACCEPT.

Cl 55 SC 55.5.2 P56 L57 # 52  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Sentence ends in a colon with related information on the next page.  
 Suggested Remedy  
 Use "keep with next" properties to keep sentence with colon with the related information.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.

Cl 55 SC 55.5.3 P61 L # 122  
 Chris Pagnanelli Solarflare Communicat  
 Comment Type T Comment Status A  
 Complete transmitter electrical specification requires specification of a transmit PSD.  
 Suggested Remedy  
 55.5.3.3 Transmit PSD Mask  
 The measured transmit PSD shall not exceed the PSD mask specified in the following equation and in Figure 55-xx, at all frequencies from 1 MHz to 3000 MHz. The PSD shall be measured into a 100 ohm load.  
 <Insert figure and equation from "10GBASE-T Tx PSD Mask Proposal" contribution page 5>  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Page number reference changed to page 4  
 Moved by: George Zimmerman; seconded by : Albert Vareljian  
 Task force: Y : 27 N: 3 A: 20  
 Comment is accepted;  
 Technical: requires >=75%  
 <Insert figure and equation from "10GBASE-T Tx PSD Mask Proposal" contribution page 4>

Cl 55 SC 55.5.3.1 P61 L46 # 53  
 Booth, Brad Intel  
 Comment Type E Comment Status A  
 Missing period.  
 Suggested Remedy  
 Add period at end of paragraph.  
 Response Response Status C  
 ACCEPT.

Cl 55 SC 55.5.3.2 P62 L 29 # 137

Babanezhad, Joseph Plato Networks

Comment Type T Comment Status R pmaelec

The value of waveform at point G being 94.5% of that of point F is inconsistent with transformer's lower -3dB point being as high as 100 kHz.

Suggested Remedy

Response Response Status C

REJECT.  
This is a repeat of comment #136. Please refer to response on Comment #136

Cl 55 SC 55.5.3.2 P62 L 29 # 136

Babanezhad, Joseph Plato Networks

Comment Type T Comment Status A pmaelec

The value of the waveform at point G being 94.5% of that of waveform F is inconsistent with transformer's lower -3dB frequency being as high as 100 kHz

Suggested Remedy

Use a tolerance less than 94.5% (e.g. 90%).

Response Response Status C

ACCEPT IN PRINCIPLE.  
Under each subclause of 55.5, after the heading, insert an editors' note stating whether the section has been adopted by the task force.

Cl 55 SC 55.5.4 P65 L 40 # 121

Takeshi Nagahori NEC Eelectronics

Comment Type T Comment Status R pmaelec

Unlike 1000BASE-T, a disturb signal Vd is not appeared in transmitter nonlinearity test. The omission of Vd reduces the test accuracy for a transmitter that is operating with finite power supply voltage such as 2.5V or 3.3V Vdd.

Suggested Remedy

Response Response Status C

REJECT.  
Remedy not suggested. However Task force should discuss further.

Editor's explanation:  
The inclusion of a sinusoidal disturber signal in 1000BASE-T was an approximate measurement, as the received signal has very different characteristics than a sine wave. The disturber has more relevance when the distortion test is conducted in the time domain, when PAM symbols are transmitted and a sinusoidal disturber giving some representation of the far end signal is provided and removed and its distortion counted. In the method stated in Draft1.1, where a sine wave distortion test is suggested, the disturber has minimal relevance, as it amounts to just raised sinusoidal output voltage at the transmitter.

Cl 55 SC 55.5.4 P66 L 2 # 138

Babanezhad, Joseph

Comment Type T Comment Status A

It is not clear why TX path's stringent linearity requirement of 66 dB (see [http://www.ieee802.org/3/an/public/may04/gupta\\_1\\_0504.pdf](http://www.ieee802.org/3/an/public/may04/gupta_1_0504.pdf)) can be satisfied by having the waveforms at points C and D (Figure 55-22) differ by less than 2% from 0.5 times the average of the peaks of the waveform at points A and B.

Suggested Remedy

The PHY can store the digital contents for generating either a single-tone or two-tone output at the output of TX path. This way by either measuring the harmonic or intermodulation contents at the TX output one can reliably measure the linearity (i.e. distortion) of TX.

Response Response Status C

ACCEPT IN PRINCIPLE.  
Motion to adopt proposed response listed below:  
Moved by Joseph Babanezhad Seconded by Bijit Halder

Task force: Y: 8 N: 1 A: a lot

Technical: requires >=75%

Motion passes;

The PHY can generate a TBD pattern at the output of TX path. This way by either measuring the harmonic or intermodulation contents at the TX output one can reliably measure the linearity (i.e. distortion) of TX.

Cl 55 SC 55.7 P75 L 3 # 55

Booth, Brad Intel

Comment Type E Comment Status A cabling

Unnecessary capitalization.

Suggested Remedy

Change "4-Pair" to be "4-pair".

Response Response Status C

ACCEPT.



Cl 55 SC 55.7 P75 L4 # 58  
 Booth, Brad Intel  
 Comment Type E Comment Status A cabling  
 Reference the subclause back to itself.  
 Suggested Remedy  
 Replace "55.7" with "this subclause".  
 Same applies to bullet b) in 55.7.1.  
 Response Response Status C  
 ACCEPT.

Cl 55 SC 55.7 P75 L5 # 113  
 Halder, Bijit Plato Networks  
 Comment Type E Comment Status A  
 The parenthesis around 2500 is not needed. Also, a different notation is used for Mb/s.  
 Suggested Remedy  
 Remove the parenthesis, and through out the document use single notation for the same unit: either Mbps or Mb/s.  
 Response Response Status C  
 ACCEPT. on removal of parenthesis.  
 Decide on use of Mbps or Mb/s. Mbps used in clause 40.

Cl 55 SC 55.7 P75 L6 # 56  
 Booth, Brad Intel  
 Comment Type E Comment Status A cabling  
 Remove parantheses.  
 Suggested Remedy  
 Change from "(2500)" to "2500".  
 Response Response Status C  
 ACCEPT.

Cl 55 SC 55.7 P81 L1 # 60  
 Booth, Brad Intel  
 Comment Type TR Comment Status D cabling  
 There are multiple references to Augmented Category 6 and Augmented Class E "channels". The draft also uses the same wording for a Class E "channel" and a Class F "channel". The draft contains the words "cabling" also associated with Class E and Class F.  
 The use of "cabling" and "channel" with the use of the word "Augmented" gives the impression that 802.3an is specifying a new cabling.  
 Suggested Remedy  
 Insert a reference in 55.7 to Annex 55A. Create an informative annex, Annex 55A to contain all the information relative to Augmented.

See booth\_2\_1104.pdf as an example.  
 Response Response Status Z  
 WITHDRAWN.  
 55.7 Editor's comment:  
 The TG has agreed to adopt an augmented Category 6 objective. The 802.3an Draft1.1 reflects that agreement.

Cl 55 SC 55.7.1 P75 L14 # 57  
 Booth, Brad Intel  
 Comment Type E Comment Status R cabling  
 Missing period.  
 Suggested Remedy  
 Add period at end of paragraph.  
 Response Response Status C  
 REJECT.  
 There is a period

IEEE P802.3an Comments

CI 55 SC 55.7.2 P75 L25 # 59  
 Booth, Brad Intel  
 Comment Type TR Comment Status A cabling  
 This section of the draft follows too closely how Clause 40 specified its link segment characteristics. While the concept is okay, 802.3an has more than one link segment.  
 Suggested Remedy  
 See document booth\_1\_1104.pdf for recommended changes.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Motion that the editor work with the commenter to generate a single worst case link segment in the next draft.  
 M: A. Flatman S: M. McConnell  
 Task force members: Y: 14 N: 3 A:5  
 Technical (>=75%)  
 Motion passes

CI 55 SC 55.7.2.1 P75 L54 # 114  
 Halder, Bijit Plato Networks  
 Comment Type T Comment Status A formula  
 The coefficient 0.169 in front of the term "f" is incorrect.  
 Suggested Remedy  
 Replace it with the correct value 0.0169.  
 Response Response Status C  
 ACCEPT.  
 Thanks for catching the typo

CI 55 SC 55.7.3.2.1.3 P80 L48 # 115  
 Halder, Bijit Plato Networks  
 Comment Type E Comment Status A  
 The word "are" is repeated.  
 Suggested Remedy  
 Remove one of them.  
 Response Response Status C  
 ACCEPT.

CI 55 SC 55.7.3.3.3 P82 L26 # 116  
 Halder, Bijit Plato Networks  
 Comment Type T Comment Status A formula  
 The multiplication factor (length\_m/100) does not multiply all the terms. Also, the reference to it in the next line is incorrect.  
 Suggested Remedy  
 Use a brace around the rest of the equation after the multiplication factor, and change the reference to Length\_m instead of Length.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 For the purpose of adjusting the PSANEXT the (cable) insertion loss

CI 55 SC 55.7.3.3.4 P82 L45 # 117  
 Halder, Bijit Plato Networks  
 Comment Type T Comment Status A formula  
 The multiplication factor (55/100) does not multiply all the terms.  
 Suggested Remedy  
 Use a brace around the rest of the equation after the multiplication factor.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 See response to Comment #116

CI 55 SC 55.8 P88 L33 # 65  
 Booth, Brad Intel  
 Comment Type TR Comment Status A cabling  
 Not sure if this should be in 55.8 or 55.9. Probably something needs to be done in both. There is no information on powered MDIs or on installation in a powered MDI environment.  
 Suggested Remedy  
 The Task Force has an objective to coexist with powered MDI, but the draft has no explanation of what that means. Add text that stipulates that a powered MDI will not disrupt 10GBASE-T and vice versa. Also add a recommended that powered cables should not be bundled with 10GBASE-T cables due to the impact of thermal emissions from powered cables could dramatically impact the loss characteristics of unpowered cables.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Add text that stipulates that a powered MDI will not disrupt 10GBASE-T and vice versa.  
 Generate a liaison letter to ISO/IEC and TIA

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CI 55 SC 55.8.1 P85 L 14 # 61

Booth, Brad Intel

Comment Type E Comment Status A

Figure 55-30 is in the middle of the paragraph.

*Suggested Remedy*

Move the anchor point for the figure to the end of the paragraph.

Response Response Status C

ACCEPT.

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CI 55 SC 55.8.3 P86 L 26 # 62

Booth, Brad Intel

Comment Type T Comment Status R cabling

The test references Category 6 which is in TIA when the rest of the document references Class E.

*Suggested Remedy*

Change "Category 6" to "Class E" and use ISO/IEC reference.

Response Response Status C

REJECT.

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CI 55 SC 55.8.3.2 P86 L 60 # 63

Booth, Brad Intel

Comment Type E Comment Status A

Sentence is floating relative to equation.

*Suggested Remedy*

Add a colon at end of the sentence and keep the sentence with the corresponding equation.

Response Response Status C

ACCEPT.